II. *An Account of the Evaporation of Water, as it was Experimented in* Gresham Colledge *in the Year* 1693. *With some Observations thereon. By* Edm. Halley.

IN order to explain the Circulation of Vapour Experimentally, I caused an Experiment of the Quantity of Vapour arising simply from the warmth of the Water, without being exposed either to Sun or Wind, to be made in *Gresham Colledge*, which has been performed with great Care and Accuracy by Mr. *Hunt*, Operator to the Society : Having added up into one Sum the Evaporations of the whole Year, I find that, from a Surface as near as could be measured of 8 Square Inches, there did Evaporate during the Year, 16292 Grains of Water, which is 64 Cube Inches of Water, and that divided by 8 Inches the Area of the Water's Surface, shews that the depth of Water evaporated in one Year amounts to 8 Inches. But this is much too little to answer to the Experiments of the *French*, who found that it rained 19 Inches Water in a Year at *Paris*. Or those of Mr. *Townley*, who by a long continued Series of Observations has sufficiently proved that, in *Lancashire* at the foot of the Hills, there falls above 40 Inches of Water in the Years time. Whence it is very obvious, that the Sun and Wind are much more the causes of Evaporation, than any internal heat, or agitation of the Water. The same Observations do likewise shew an odd quality in the Vapours of Water, which is that of adhering to the Surface that exhaled them, which they cloath as it were with a Fleece of Vaporous Air, which once investing it, the Vapour rises afterwards in much less quantity : which was shewed by the small quantity of Water that was lost in 24 hours time,

when

when the Air was very still from Wind, in proportion to
what went away when there blew a strong gale, although
the Experiment were made, as I said, in a place as close
from the Wind as could well be contrived. For which
reason I do not at all doubt, that had the Experiment
been made where the Wind had come freely, it would
have carried away at least three times as much as we
found, without the assistance of the Sun, which might
perhaps have doubled it. By the same Experiment it
likewise appears, that the Evaporations in *May*, *June*,
July, and *August*, which are nearly equal, are about three
times as much as what evaporated in the four Months
of *November*, *December*, *January*, and *February*, which
are likewise nearly equal : *March* and *April* answering
nearly to *September* and *October*. This Fleece of Va-
pour in still Weather hanging on the surface of the Wa-
ter, is the occasion of very strange Appearances by the
refraction of the said Vapours differing from that of the
Common Air, whereby every thing appears raised; as
Houses like Steeples, Ships as on Land above the Water,
and the Land raised, and as it were lifted from the Sea,
and many times seeming to over-hang. And this may give
a tolerable Account of what I have heard of seeing the
Cattle at *High-water-time* in the *Isle of Dogs* from *Green-
wich*, when none are to be seen at *Low-water*, (which
some have endeavoured to explain by supposing the *Isle
of Dogs* to have been lifted by the *Tide* coming under
it.) But the evaporous *effluvia* of Water, having a grea-
ter degree of refraction than the *Common Air*, may suf-
fice to bring those Beams down to the Eye, which when
the Water is retired, and the Vapours subsided with it,
pass above, and consequently the Objects seen at the
one time, may be conceived to disappear at the other.

A

A **T A B L E** *ſhewing the Evaporations of Water*, Anno 1693. *with the heights of the* Thermometer *and* Barometer *at* 8 *of the Clock each Morning.*

	January.				February.		
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	31 ½	5	29, 7 Froſt.	1	36	29	30, 0
2	21	14	29, 7 ſome Ra.	2	27	26	30, 2
3	21	12	29, 7	3	33	25	30, 2
4	23 ½	8	29, 7	4	48	16	29, 9
5	23 ½	8	30, 1	5	30 ½	20	29, 9 ſome Ra.
6	26 ½	1	30, 5 Froſt.	6	26	16	29, 9 ſmall Ra.
7	31	— 3	30, 5 Froſt.	7	26	17	29, 8
8	25	— 5	30, 4 Froſt.	8	28	11	29, 9 a Fogg.
9	23	— 3	30, 4 Froſt.	9	23	16	30, 0
10	18	0	30, 4	10	26	20	30, 0
11	18	0	30, 4	11	39	8	30, 0
12	18	0	30, 4	12	40	5	29, 8
13	22	— 6	30, 3 Froſt.	13	52	— 1	29, 4 high Wi.
14	20 ½	— 7	30, 3 Froſt.	14	35	6	29, 2
15	21 ¼	—10	30, 3 Froſt.	15	35	11	29, 4 ſome Ra.
16	24	—15	30, 4 Froſt.	16	24	20	29, 2 Rain.
17	18	—13	30, 3 ½ Froſt.	17	39	20	29, 5 Rain.
18	18	—11	30, 2 Froſt.	18	39	19	29, 8
19	14	—10	30, 1 Froſt.	19	35 ½	17	29, 7
20	14	— 3	29, 6	20	35 ½	16	29, 3
21	21	0	29, 9	21	35	17	29, 0 Rain.
22	18	2	29, 9	22	29	10	29, 2
23	18 ½	0	30, 0 Froſt.	23	35	5	29, 3
24	18 ½	— 3	30, 0 Froſt.	24	37	1	29, 2
25	14 ½	9	29, 9	25	35	— 5	29, 4
26	14 ½	14	29, 7	26	23 ½	— 8	29, 0 Snow.
27	20	17	29, 2	27	21	—11	29, 4 Froſt.
28	36	10	29, 7	28	24	—14	29, 3 Froſt.
29	27 ½	15	29, 5 ſome Ra.		690 ½ Grains.		
30	27 ½	15	29, 7				
31	27	27	29, 6				

675 Grains.

March.				April.			
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	25	—12	29, 2 Froſt.	1	32	15	29, 4
2	31 ½	—12	29, 1 Snow.	2	29	15	29, 5
3	28	—13	29, 3 Sno.Froſt.	3	37 ½	14	29, 7
4	28	—12	29, 6 Froſt.	4	37	23	29, 6 ½
5	28	— 8	29, 3 Froſt.	5	38	29	29, 2
6	20	— 1	29, 1	6	29	32	29, 2
7	35 ½	—5	29, 3 Rain.	7	32	33	29, 3
8	39	9	29, 7	8	32	35	29, 4
9	42 ½	8	30, 0	9	28 ½	40	29, 2
10	39	14	30, 0	10	35	33	29, 4
11	33	21	30, 0	11	37	33	29, 4
12	42	21	29, 8	12	34	37	28, 9
13	42	22	29, 6 ½	13	39	32	29, 4
14	46	23	29, 4	14	39	33	29, 5
15	62 ½	14	29, 6	15	39	29	29, 7
16	41	19	29, 5	16	35	30	29, 8
17	42 ½	12	29, 4	17	37	31	29, 6 ½
18	50	10	28, 9	18	36 ½	36	29, 4
19	51 ½	7	29, 2	19	33 ½	36	29, 3 ½
20	45	8	29, 2	20	36	32	29, 3
21	41	7	29, 0	21	39	37	29, 2
22	50	8	29, 4	22	46	35	29, 4
23	37	10	29, 5	23	42 ½	35	29, 5
24	33 ½	6	29, 4	24	52	35	29, 2
25	27 ½	7	29, 3	25	50	35	29, 3 ½
26	30	11	29, 4	26	95	36	29, 7
27	57	9	29, 6	27	38	44	29, 5
28	38	4	29, 6	28	43	46	29, 7 ½
29	30	17	29, 5	29	40	49	29, 6
30	30	—20	29, 4 ½	30	52	42	29, 9
31	20	24	29, 3				

1166 Grains.

1203 Grains.

	May.				June.		
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	56	36	30, 1	1	78	65	29, 9
2	61	26	30, 0	2	85	62	30, 0
3	66	21	30, 1	3	95	54	30, 2
4	61	19	30, 1	4	77	52	30, 1 ½
5	52	31	30, 1	5	63	50	29, 9
6	48	45	29, 8	6	49	60	29, 7 ½
7	59 ½	35	29, 8	7	46	67	29, 7
8	51	34	29, 7	8	63	63	29, 7
9	51	31	29, 6	9	63	69	29, 8
10	43	35	29, 5	10	63	71	29, 8
11	49	30	29, 5	11	55	70	29, 8 ½
12	54	32	29, 6	12	58	87	29, 8
13	59	26	29, 7	13	59	75	29, 9
14	59	32	29, 7 ½	14	86	72	29, 7
15	46 ½	35	29, 7	15	63	79	29, 8
16	46 ½	34	29, 8 ½	16	58	78	29, 9
17	56	36	30, 1	17	86	79	30, 0
18	70 ½	36	30, 3	18	81	66	30, 0
19	58 ½	47	30, 1	19	92	57	30, 1
20	76	50	30, 0	20	81	60	30, 0
21	62	52	30, 1	21	80	71	29, 9
22	73	64	30, 1	22	76	67	29, 8
23	78 ½	64	30, 1	23	63	69	29, 7
24	90	62	29, 9 ½	24	63	62	29, 6
25	61	74	29, 9	25	57	65	29, 8
26	67 ½	68	29, 9 ½	26	46	70	30, 0
27	64	75	29 9 ½	27	49 ½	68	30, 0
28	71	67	30, 1	28	52	74	30, 0
29	80	69	30, 2	29	59	68	30, 2
30	89 ½	70	30, 2	30	62	69	30, 2
31	106	68	29, 9				

1968 Grains.

2008 ½ Grains.

July.

	July.				August.		
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	75	67	30, 0	1	80	71	29, 5
2	75	67	30, 0	2	77	73	29, 6
3	63	62	30, 0	3	77	63	29, 8
4	62	61	30, 1	4	78	64	29, 9
5	60	63	30, 1	5	79	73	29, 9
6	74	65	30, 0	6	81	70	29, 9
7	61	65	30, 0	7	94	83	29, 6
8	51	65	30, 0	8	79	86	29, 6
9	46	74	29, 9	9	68	82	29, 7
10	52	77	29, 9	10	70	83	29, 8
11	72	74	29, 8	11	92	85	29, 8 ½
12	74	82	29, 4	12	70	80	30, 0
13	88	75	29, 7	13	81	73	29, 9
14	83	62	29, 9	14	68	75	29, 7
15	84	65	30, 1	15	69	74	29, 9
16	84	68	29, 8	16	77	72	29, 8
17	71	58	30, 1	17	77	77	29, 7
18	77	65	30, 2	18	84	77	29, 7
19	66	78	30, 1 ½	19	86	64	29, 5
20	71	78	30, 1	20	78	68	30, 0
21	72	82	30, 0	21	68	67	29, 7
22	90	74	30, 0	22	71	65	29, 7
23	99	68	30, 0	23	75	55	29, 9
24	85	71	30, 0	24	64	54	29, 5
25	85	81	29, 9	25	63	57	29, 5
26	94	75	29, 9 ½	26	58	59	29, 4
27	97	70	29, 8	27	60	55	26, 5
28	81	78	29, 7	28	53	55	29, 9
29	87	67	29, 9	29	53	58	29, 7
30	78	64	29, 9	30	53	56	29, 7
31	78	79	29, 3 ½	31	63	48	29, 7

2335 Grains. 2246 Grains.

September.

	September.				October.		
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	53	53	29, 7	1	40	35	29, 9
2	55	50	29, 6	2	37	41	29, 6
3	61	50	29, 7	3	41	35	29, 7
4	61	48	29, 7	4	27	49	29, 6
5	63	44	29, 8	5	29	48	30, 0
6	74	40	29, 7	6	31	49	30, 2
7	62	39	29, 6	7	29	58	30, 0
8	59	49	29, 5	8	37	60	30, 0
9	40	52	29, 5	9	39	59	30, 2
10	50	48	29, 6 $\frac{1}{2}$	10	37	55	30, 1
11	46	41	29, 7	11	34	55	29, 9
12	48	43	28, 8	12	38	55	29, 8
13	46	53	29, 7	13	39	42	30, 0
14	43	57	29, 5	14	49	38	29, 8
15	46	70	29, 2	15	44	28	29, 7
16	49	54	29, 3	16	44	19	29, 7
17	46	52	29, 1	17	35	23	29, 1
18	52	45	29, 0	18	34	24	29, 2
19	48	45	29, 3	19	34	20	29, 2
20	50	44	29, 6	20	35	21	29, 5
21	43	42	29, 9	21	35	17	29, 9
22	41	51	29, 5	22	24	28	29, 7
23	46	45	29, 9	23	28	25	29, 7
24	44	52	29, 7	24	39	20	30, 0
25	41	47	29, 8	25	41	13	30, 0
26	43	47	29, 6	26	34	16	29, 9
27	46	45	29, 7	27	33$\frac{1}{2}$	13	30, 0
28	47	40	29, 9	28	32	18	29, 8
29	50	44	29, 8	29	33	10	29, 8
30	40	42	29, 5	30	35	5	29, 7
	1495 Grains.			31	28	7	29, 4
					1095 Grains.		

F f

November.				December			
D.	Grain.	Ther	Barometer.	D.	Grain.	Ther	Barometer.
1	18	22	29, 6	1	34 ½	—16	30, 0 Froſt.
2	15	30	29, 7	2	16 ¼	—10	30, 0 Rain.
3	24	34	29, 6	3	12	— 0	29, 9
4	26	30	29, 7	4	12	7	29, 4 ſome Ra.
5	33	21	29, 8	5	17 ½	10	29, 2
6	33	10	29, 8	6	33	15	29, 4 ſome Ra.
7	29	9	29, 7	7	19 ½	15	29, 1 ½ (wind.
8	20	23	29, 5	8	13	20	29 0 R & much
9	21	21	29, 9	9	18	27	28, 6⅔ R.& ſtor.
10	21	30	29, 7	10	25	16	28, 9 ſome Ra.
11	32	27	29, 7	11	28 ¾	13	29, 6
12	22 ½	34	29, 5	12	28	9	29, 5
13	31	23	29, 4	13	25	14	29, 2
14	25 ¼	15	28, 9	14	15	20	29, 2 ſome Ra.
15	27	10	29, 4	15	19	20	29, 5
16	25 ½	3	29, 6	16	22 ½	15	29, 5
17	26	— 7	29, 5	17	17 ½	20	29, 5
18	21	— 1	29, 5 great fog.	18	21 ½	10	30, 1
19	21	— 2	29, 5 great fog.	19	22	3	30, 0
20	19	2	29, 6	20	16	6	29, 8
21	15	5	29, 8 Fog.	21	14 ½	9	29, 6
22	11 ½	12	29, 7 ſome Ra.	22	16 ½	14	29, 3
23	20 ½	14	29, 7	23	22	11	28, 5 Stormy.
24	24 ½	8	29, 8	24	23	4	29, 0
25	24 ½	5	29, 9	25	22	0	29, 5 Froſt.
26	33	—12	29, 9 Froſt.	26	22	5	29, 2, Rain.
27	33 ½	—12½	29, 9 Froſt.	27	16	10	29, 3
28	27	—14	29, 8 Froſt.	28	20	6	29, 0
29	42	—16	29, 8 ⎱ water	29	25 ½	0	29, 2 Froſt.
30	42	—17	29, 9 ⎰ frozen.	30	19 ½	5	28, 6 Stormy.
	764 Grains.			31	24	7	29, 2
					646 Grains.		

Note, That in the Column of the Thermometer, — denotes degrees of Cold below the freezing Point; and that from the 10th. of November to the end belong to the foregoing Year 1692.

III. A